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AN ABNORMAL WINTER FLOUNDER AND OTHERS.

In early February, 1916, the American Museum of Natural History received from Messrs. L. & F. Nagele, retail fish dealers, a remarkable specimen of winter flounder (*Pseudopleuronectes americanus*) from the New York market. The depth of its body is contained 1.6 times in length to the base of the caudal fin, instead of 2.4 times as is normal for the winter flounder. Other differences are a concave profile and an arch at the front of the lateral line. I believe the specimen a hybrid between *Pseudopleuronectes* and *Limanda ferruginea* which is almost equally common near New York in deeper water off shore. The great depth of body, however, is as foreign to one as to the other of these species.

Both *Pseudopleuronectes* and *Limanda* belong to the specialized group of flounders with ventral fins nearly or quite symmetrical and small twisted mouths (*Pleuronectinae*), a group in which so deep a body is very rare; whereas the adjoining specialized group with symmetrical mouths and asymmetrical ventrals (*Psettinae*) contains many such deep-bodied forms as the Turbot, Sundial, etc. Also the Craig-Fluke (*Glyptocephalus*), a terminal member of the *Pleuronectinae*, is decidedly elongate. There is then evidence that loss of depth has been to some extent cor-

related with specialization (it becomes degeneration in the terminal flatfishes) in the *Pleuronectinae* though not in the *Psettinæ*, and plausibility is given to the abnormal depth of the specimen under consideration being a reversion to a character possessed by some common ancestor of both *Pseudopleuronectes* and *Limanda*.

In 1828 Cuvier described as *Pleuronectes latus* from the coast of France a similar deep flounder which Günther (1862) thought might be simply an abnormal Plaice (*Pleuronectes platessa*) and which Jordan and Goss (1889) unreservedly considered as such. The Plaice is a common European flat-fish corresponding in many ways to our winter flounder, and our specimen is probably a homolog of Cuvier's.

Speaking of *Pseudopleuronectes americanus* in "American Fishes" Goode says: "There is very little evidence of a tendency to move to and from the shore with a change of season." We know that *Limanda ferruginea* more or less replaces it in deeper water off our coast. It may be interesting to note that I have seen one or two taken with numerous *Limanda* in 21 fathoms south-east of New York Bay, November 21, 1912, and these two species taken together in 18 fathoms south of Southampton, Long Island, November 23.

About August 1, 1917, there was an unusually heavy mortality of *Pseudopleuronectes americanus* in Moriches Bay, Long Island, N. Y. This is a broad almost tideless bay, but much of it is very shallow (extensive flats having but a few inches of water) and it is decidedly brackish. The channels coming in from the west through the narrows which separate this from Great South Bay, are salt enough, but some of the landward spring-fed "creeks" are pure fresh water, and the water on the sea-ward side, under the beach, which separates bay from ocean, is surprisingly fresh. This condition is probably due to the fact that the opening of these waters to the ocean is

twenty-five miles west at the farther end of Great South Bay, namely Fire Island Inlet.

Pseudopleuronectes is one of the few marine fishes found in the bay in numbers. An exceptional number of dead of this species were noticed on July 28, and on August 4 it was estimated that a thousand dead were seen. They averaged about 8 or 9 inches in total length. This high mortality was probably correlated with a period of unusually hot weather which that section had just experienced. It also should be born in mind that this is a northern fish, which, though it extends to Chesapeake Bay, is less numerous, especially in summer, south of New York. Similarly, I have seen large numbers of winter-killed *Cyprinodon variegatus* on Long Island, a fish whose range is southern and extends northward only to Cape Cod.

Unfortunately no data is accessible as regards the temperatures which accompanied the mortality of flounders, except my recollection that the locality was, more than it is usually, affected by the heat-waves than present. Data for July and August, 1917, at New York City kindly furnished me by the local office of the United States Weather Bureau gives an idea of the date and severity of these heat-waves. The mean daily temperature was above 75° on July 2 (77); again on July 16 to 17 (76, 78); on July 20 to 27 (76, 76, 76, 78, 78, 77, 78, 82); July 30 to August 2 (85, 89, 89, 84); August 7 (78); August 9 (78); August 13 (76); August 15 (76); August 17 (77); August 20 to 21 (76, 76); August 24 (76); August 29 (76).

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CHAETODON OCELLATUS ON THE LONG ISLAND SHORE.

On the forenoon of October 12, 1917, while Mr. J. T. Nichols and I were at Long Beach, Long Is-

land, N. Y., a young specimen of *Chaetodon ocellatus* Bloch was thrown out on the sand by a rather heavy surf that was driving ashore before strong southerly winds. The fish measures 30 mm. in total length including caudal.

This butterfly fish has been recorded frequently in Buzzards Bay between August and November, and also in Narragansett Bay. Near Woods Hole, Mass., twenty or more have been seined in the eel-grass patches during single days in September and October. In Long Island waters, however, the species is known to have been taken only twice previously, both times during October, and only in the shallow waters of Gravesend Bay. It is of interest and probable significance, to note that its presence in the open sea off Long Beach on October 12 was coincident with a southeast wind, which had arisen just before midnight of October 11, and which increased steadily in force to a maximum of 56 miles per hour (New York City) at 3:55 P. M., October 12. The influence of this wind was apparently reflected in the temperature of the sub-surface water of New York harbor, for after it had fallen steadily from 65° F. on October 5 to 62.5° F. on October 11, it rose again one-half degree Fahrenheit on October 12.

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BUFO FOWLERI IN MICHIGAN, INDIANA AND ILLINOIS.

Fowler's Toad has recently been shown to have a widespread distribution along the Atlantic Coast. Its range is much wider still, as it occurs in Michigan, Indiana and Illinois. The only definite records found by the writer, for the Middle West, are based on collections from Barrien County¹ in southwestern

¹ See Ruthven, Occ. Pap. Mus. Zool. Univ. Mich., 47, October 13, 1917, pp. 1-5, pl. 1.

Michigan. From all these reports it appears that *Bufo fowleri* tolerates comparatively dry, sandy conditions. Confirming and extending these observations, the writer has found the species to be quite common in the sand dune region skirting the southern shores of Lake Michigan. These dunes in Indiana are crossed and recrossed by the tracks of this toad, and the beach shows similar evidences of their incursion, the windrows of insects along the shore probably accounting for their presence there.³ Adults were secured near Mineral Springs and near Miller, hopping about in the dunes at twilight and dusk, and on cloudy afternoons. The color and maculation of Fowler's Toad matches the sand very well; its agility is necessary to enable it to hop up the dunes of shifting sand.

The young of *Bufo fowleri*, from 16 to 22 mm. long in body length, were found in the sand dune region near Miller, Indiana, on September 23, 1917. They were hopping about in abundance in the middle of the sunny day, along the flat sandy shores of certain ponds containing a moderate amount of vegetation, but not along those parts of the shore where shrubs and trees grow in and near the water. When chased into the water they refused to dive, but swam on the surface, throwing their heads back rather violently when taking breath. More often they took to the dunes, which they climbed with the characteristic agility of the species. One was found half buried in the dry sand. Similar specimens, from 10 to 24 mm. long, were caught under sticks and stones about the first ponds back of the beach at Pine, Indiana, on September 30, which was a cold, windy day. These ponds were just becoming captured by *Chara*. Some of the toads were found a fourth of a mile from the ponds, but always in moist sand near the beach; far-

³ Dr. Shelford described this situation in his *Animal Communities in Temperate America*, (1913, p. 222), but recorded the species as "the common toad."

ther inland, where the *Chara* of the ponds is becoming replaced by lilies and rushes, and where the soil is becoming converted into dark humus, an adult female and a young specimen (26 mm. long) of *B. americanus*, but none of *B. fowleri*, were found on the same date. All of the distinctive characters of the two species concerned are evident in the young, quite as well as in the adult. The belly is glossy white, often with a dash in the middle of the breast, and sometimes with a limited amount of further maculation. The upper sides are colored very much like the sand; the bluish-gray ground color is mottled with greenish; the warts are reddish; the black spots often appear as rings surrounding the red warts.

Other typical specimens of *Bufo fowleri* are at hand from Pikeville, Indiana (September 2) and La Porte, Indiana (July), and from the sand dunes at Waukegan, Illinois (June 8); the largest individual examined, a female 75 mm. long comes from Muskegon County, Michigan. Under the name of *Bufo lentiginosus* var. *lentiginosus*, H. Garman³ has recorded a toad which is probably *Bufo fowleri* from Anna and Villa Ridge, southern Illinois. He wrote: "Attention was called to these toads by the peculiar note they uttered, a note quite unlike the trill of the toads which collect in the ponds in central Illinois in the spring of the year. The note consists of a prolonged and rather shrill scream repeated at short intervals at dusk in summer evenings. The toads themselves were more active than their more northern cousins." The description he gives of these toads agrees most closely with *B. fowleri*, but the reduced size of the spots and the rather elevated cranial ridges he mentions, lend some doubt to the determination. It is probable that several other records of *B. americanus* in the Great Lakes and upper Mississippi Valley regions refer rather to *B. fowleri*.

³ Bull. Ill. State Lab. Nat. Hist., 3, 1892, p. 335.

The American Toad is not represented in the collection examined from the sand dunes about Lake Michigan, but it does occur plentifully in other habitats. Specimens of *Bufo americanus* have been examined from La Porte, Indiana (July), and from various localities in and about Chicago, such as Jackson Park; West Pullman; Glen Ellyn; along Hickory Creek between New Lenox and Joliet; on the clay bluffs at Winnetka, and from dark soil in the uplands at Waukegan (all in Illinois); also from Pine Station, and from between the Grand Calumet and Little Calumet Rivers, both in Gary, Indiana. Thus it appears, in the region about the southern end of Lake Michigan, that the two species of toads are more or less complimentary in their distribution, *B. fowleri* inhabiting the drier and sandier regions. Throughout this area the species seem to be readily separable, their distinctive characters being almost always well-marked. That these specimens of *B. fowleri* are typical has been further assured by their comparison with eastern material kindly loaned by the American Museum. The only difference noted consisted in the fact that the cranial ridges are separated a little more widely from one another than in the Atlantic Coast series. The same difference has been noted by Ruthven, but it is not constant.

The hypothesis of the occasional hybridization of *Bufo americanus* and *B. fowleri*, already suggested, receives support from the study of a series of toads from Olive Branch, near the southernmost tip of Illinois, collected by C. M. Barber on May 7-8, 1907. Some of these toads are typical of *americanus*, some correspond wholly with *fowleri*, yet others can be referred to neither species, all of their characters being variously intermediate and mixed.

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THE SPADE-FOOT TOAD IN VIRGINIA.

On July 15, 1916, Dr. Henry Fox obtained a fine example of *Scaphiopus holbrookii* which he forwarded soon after. He wrote "the specimen as well as several other examples were exposed in plowing a stubble-field and attracted attention by the extraordinary loud and shrill cry they made when crushed by the plow." Mr. E. R. Dunn informs me this amphibian has not been definitely recorded from Virginia and the above examples all observed at Tappahannock, are therefore of interest. In this connection I may also mention that under date of June 7, 1916, Mr. H. Walker Hand writes from Cape May, N. J.: "On May 28 Dr. J. S. Eldridge and myself were walking along a wood-road and heard a peculiar cry coming from the ground. I had heard the same before, but could not find the source. This time I dug down and the sound continued even as I was digging. At a depth of about three inches a spade-foot was found snugly fixed. He never stopped calling until I lifted him out."

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